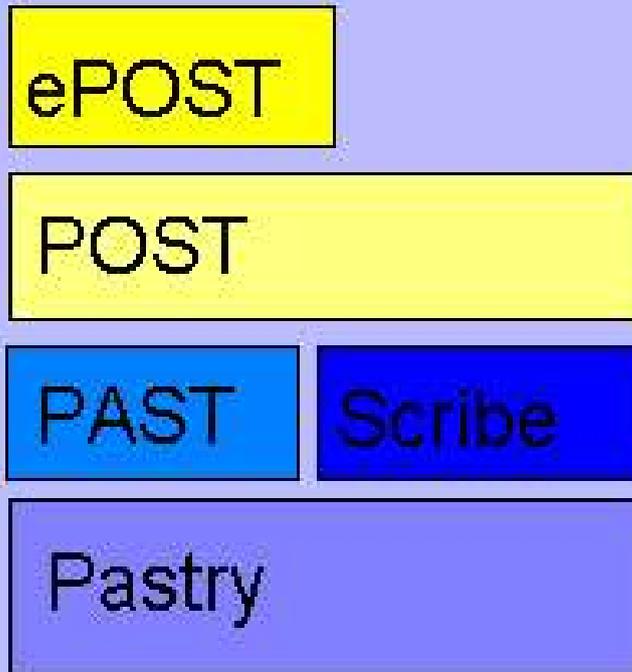


Distributed Mail Servers

- **POST: A secure, resilient, cooperative messaging system**
(A. Mislove, A. Post, C. Reis, P. Willmann, P. Druschel, D. S. Wallach, X. Bonnaire, P. Sens, J.-M. Busca, L. Arantes-Bezerra)
- **Manageability, Availability and Performance in Procupine: A Highly Scalable, Cluster-based Mail Service**
(Y. Saito, B. N. Bershad and H. M. Levy)

POST, ePOST



- **ePOST**
SMTP-, IMAP -Server
- **POST**
message storage,
metadata, event notification
- **PAST**
storage system
- **Scribe**
multicast system
- **Pastry**
P2P-Network

POST

- User Accounts

3 Basic Services

- Secure Message Storage
 - Event notification
 - Metadata
-
- Robustness and Security

ePOST

- Email storage
- Email delivery

- Discussion

Procupine

- Goals
- Functional homogeneity
- hard / soft state

Procupine: Data Structures

- Mailbox Fragment (*hard state*)
- Mail Map (*soft state*)
- User Profile Database (*hard state*)
- User Profile Soft State (*soft state*)
- User Map (*soft state*)
- Cluster Membership List (*soft state*)

Procupine: Self Management

- Membership service
- Coordinator of a established Cluster
- Ways to discover failures

Procupine: Mail Traffic

- Mail Delivery
- Mail Retrieval

Procupine: Replication

- Update anywhere
- Eventual consistency
- Total update
- Lock free
- Ordering by loosely synchronized clocks

- Replicating mail fragments

Procupine: Load Balancing

- Distributed Load Balancing (functional homegeneity)
- Affinity-based scheduling (spread)
- Sending Replicated Mail
- Retrieving Replicated Mail

Distributed Mail Servers: Good Or Bad?

- Positive
 - No Bottleneck at a single Mailserver
 - No need for a big server
 - Scalability
 - More resilient
 - Availability
- Negative
 - Needs (at least one) reliable workstations (POST)
 - Heterogene cluster unrealistic in many cases
 - Security
 - Storage space in ePOST